

**STRATEGIC ENERGY / WATER PLAN**

**2023 / 2024**



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# EXECUTIVE SUMMARY

UNC Pembroke continues to develop and maintain its efforts towards conservation of energy and water resources within all campus facilities. We are creating, implementing, and following an effective Strategic Energy/Water Conservation Plan. The Strategic Energy/Water Conservation Plan aims to foster economically and environmentally responsible usage of valuable resources per state legislation, while providing a positive and comfortable learning environment for students, faculty, staff, and visitors.

***Key Elements of the plan include:***

* Educate and engage faculty, staff, and students in energy and water conservation through presentations, emails, events, web pages, and other effective forms of communication that help in understanding that effective energy conservation supports the primary mission of the university and the environment.
* Conducting meetings of the UNCP Sustainability Council program in the academic year. The Council will get faculty, staff, and student organizations more involved with conservation as part of a larger scope of campus environmental stewardship efforts.
* Continue accurate measurements and analysis of electricity, fossil-based fuels, and water usage. Yearly reviews of consumption, trends, and costs will be posted on the UNCP website for the campus community to review.
* Continue to conduct annual reviews of utility billing rates with each supplier and audits of each utility invoice by our energy management efforts.
* Implement up-to-date training for Facility Operations staff to perform planned service and upgrades that improve the performance of all facility equipment and university-owned vehicles to reduce energy waste.
* Continue to benchmark and develop KPIs (key performance indicators) that clearly measure real energy and water conservation progress while factoring for facility and student growth.
* Continue finding ways to reduce energy consumption throughout the campus to reach the goal of 40% reduction of energy consumption per square foot by 2025 from the fiscal year 2002-2003 levels.

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# NORTH CAROLINA LEGISLATIVE BASIS FOR PLAN

**GENERAL ASSEMBLY OF NORTH CAROLINA**

**SESSION 2007 / SENATE BILL 668**

**RATIFIED BILL**

**AN ACT TO PROMOTE THE CONSERVATION OF ENERGY AND WATER**

**SECTION 3.1.(a)** G.S. **143-64.12. Authority and duties of State agencies. The Department; State** **agencies and State institutions of higher learning.**

1. The Department of Administration through the State Energy Office shall develop a comprehensive program to manage energy, water, and other utility use for State agencies and State institutions of higher learning and shall update this program annually. Each State agency and State institution of higher learning shall develop and implement a management plan that is consistent with the State's comprehensive program under this subsection to manage energy, water, and other utility use. The energy consumption per gross square foot for all State buildings in total shall be reduced by twenty percent (20%) by 2010 and thirty percent (30%) by 2015 based on energy consumption for the 2002-2003 fiscal year. Each State agency and State institution of higher learning shall update its management plan annually and include strategies for supporting the energy consumption reduction requirements under this subsection. Each community college shall submit to the State Energy Office an annual written report of utility consumption and costs.

**NORTH CAROLINA EXECUTIVE ORDER 80**

***NORTH CAROLINA’S COMMITMENT TO ADDRESS CLIMATE CHANGE AND TRANSITION TO A CLEAN ENERGY ECONOMY***

1. The State of North Carolina will support the 2015 Paris Agreement goals and honor the state’s commitments to the United States Climate Alliance.

The State of North Carolina will strive to accomplish the following by 2025:

* 1. Reduce statewide greenhouse gas emissions to 40% below 2005 levels;
	2. Increase the number of registered, zero-emission vehicles (“ZEVs”; individually, “ZEV”) to at least 80,000;
	3. Reduce energy consumption per square foot in state-owned buildings by at least 40% from fiscal year 2002-2003 levels.



# EXECUTIVE SUPPORT FOR ENERGY CULTURE CHANGE

1. Maintain work with key members of Senior Administration Staff to develop and publicize Strategic Energy & Water Management Policies that define:
2. The University’s commitment to a fiscally and environmentally responsible Energy and Water Management Plan.
3. Measurable and achievable goals and objectives with reasonable timelines.
4. Accountability and resources for plan implementation
5. Continuous improvement efforts after initial implementation.
6. Expand our comprehensive Strategic Energy and Water Management Plan to guide:
7. Working on the identification of energy and water conservation opportunities, concept development of projects and process changes, and prioritization of improvement efforts.
8. Provide funding and staff resources to define, develop, and execute approved energy and water-related capital projects, expense projects and process improvements.
9. Schedule reviews of conservation efforts and regular updates to the plan.
10. Continue to educate faculty, staff, and students through scheduled presentations, emails, and other effective forms of communication about the Strategic Energy and Water Management Plan. This will provide guidance into conservation measures and techniques they can implement in our daily campus environment and within home activities.
11. Include Strategic Energy and Water Management Plan presentations in appropriate campus and department meetings.
12. “Sustainability” Committee to get faculty, staff, and student organizations involved as part of larger scope environmental stewardship efforts.

******B****ASELINE ENERGY COST & KEY PERFORMANCE INDICATORS FY 22/23**

**a. Financial Evaluation Detailed Cost and Total Expenditures**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Fiscal Year** | **Electricity**  | **Natural Gas** | **Water/Sewer** | **LP Gas** | **Heat Oil #2** | **Total Utility Expenditures** | **BTU Consumption** |
| **02-03 Baseline** | $1,031,658 | $487,910 | $657,512 | $0 | $25,179 | $2,202,259 | 115,427,334,610 |
| **07-08** | $1,756,487 | $532,958 | $1,124,397 | $30,910 | $43,072 | $3,456,914 | 131,302,377,880 |
| **08-09** | $1,783,521 | $485,908 | $954,511 | $48,431 | $29,311 | $3,253,251 | 135,506,884,220 |
| **09-10** | $1,843,824 | $343,171 | $1,031,474 | $57,386 | $35,584 | $3,254,053 | 129,838,596,400 |
| **10-11** | $1,836,240 | $334,134 | $1,012,310 | $58,874 | $34,030 | $3,216,714 | 132,046,538,137 |
| **11-12** | $1,744,547 | $284,852 | $944,904 | $49,524 | $12,217 | $2,986,520 | 126,574,203,570 |
| **12-13** | $1,627,136 | $285,569 | $910,777 | $31,274 | $9,925 | $2,833,407 | 119,326,071,600 |
| **13-14** | $1,618,507 | $309,944 | $847,432 | $45,359 | $7,789 | $2,783,672 | 115,845,626,170 |
| **14-15** | $1,578,102 | $206,252 | $833,050 | $37,826 | $10,275 | $2,627,679 | 107,514,433,190 |
| **15-16** | $1,577,367 | $177,822 | $820,197 | $33,062 | $2,998 | $2,578,384 | 106,187,889,200 |
| **16-17** | $1,518,906 | $219,918 | $853,716 | $20,961 | $1,824 | $2,594,364 | 100,908,539,600 |
| **17-18** | $2,043,441 | $200,938 | $1,063,134 | $33,062 | $2,998 | $3,343,573 | 125,172,988,312 |
| **18-19** | $1,642,877 | $272,133 | $892,676 | $32,432 | $2,411 | $2,810,097 | 157,573,923,320 |
| **19-20** | $1,592,255 | $192,924 | $810,429 | $34,456 | $5,000 | $2,600,608 | 143,997,508,240 |
| **20-21** | $1,920,363 | $210,084 | $890,128  | $48,608 | $0 | $3,069,183 | 155,914,389,536 |
| **21-22** | $2,189,653 | $342,981 | $780,111 | $71,820 | $0 | $3,384,565 | 117,846,390,772 |
| **22-23** | $1,781,926 | $373,418 | $697,700 | $77,177 | $0 | $2,930,222 | 142,667,429,388 |

**b. Utility Cost per SF.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Fiscal Year** | **Electrical** | **Natural Gas** | **Water/Sewage** | **LP Gas** | **Heat Oil #2** | **Total Utility/SF** |
| **2002-03 Baseline** | $1.17 | $0.55 | $0.74 | $0.00 | $0.029 | $2.50 |
| **2007-08** | $1.58 | $0.48 | $1.01 | $0.028 | $0.039 | $3.13 |
| **2008-09** | $1.60 | $0.44 | $0.86 | $0.043 | $0.026 | $2.96 |
| **2009-10** | $1.65 | $0.31 | $0.93 | $0.051 | $0.032 | $2.97 |
| **2010-11** | $1.65 | $0.30 | $0.91 | $0.053 | $0.031 | $2.94 |
| **2011-12** | $1.39 | $0.23 | $0.75 | $0.039 | $0.010 | $2.42 |
| **2012-13** | $1.21 | $0.21 | $0.68 | $0.023 | $0.007 | $2.13 |
| **2013-14** | $1.20 | $0.23 | $0.63 | $0.034 | $0.006 | $2.10 |
| **2014-15** | $1.17 | $0.15 | $0.62 | $0.028 | $0.008 | $1.98 |
| **2015-16** | $1.17 | $0.13 | $0.61 | $0.025 | $0.002 | $1.94 |
| **2016-17** | $1.13 | $0.16 | $0.63 | $0.016 | $0.001 | $1.94 |
| **2017-18** | $1.18 | $0.12 | $0.62 | $0.019 | $0.002 | $1.94 |
| **2018-19** | $0.95 | $0.16 | $0.52 | $0.019 | $0.001 | $1.65 |
| **2019-20** | $0.92 | $0.11 | $0.47 | $0.020 | $0.003 | $1.52 |
| **2020-21** | $1.07 | $0.12 | $0.50 | $0.027 | $0.000 | $1.71 |
| **2021-22** | $1.22 | $0.19 | $0.43 | $0.040 | $0.000 | $1.88 |
| **2022-23** | $0.99 | $0.21 | $0.39 | $0.429 | $0.00 | $1.63 |

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**c. Utility Cost per Student**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fiscal Year** | **GSF** |  | **Enrollment** | **Utility Cost/ Student** |
| **2002-03 Baseline** | 879,823 |  | 4,722 | $466.38 |
| **2006-07** | 1,115,102 |  | 5827 | $483.89 |
| **2007-08** | 1,115,102 |  | 5,937 | $587.47 |
| **2008-09** | 1,115,102 |  | 6,303 | $523.83 |
| **2009-10** | 1,115,102 |  | 6,664 | $496.91 |
| **2010-11** | 1,257,102 |  | 6,940 | $471.99 |
| **2011-12** | 1,344,695 |  | 6,251 | $485.69 |
| **2012-13** | 1,344,695 |  | 6,269 | $456.96 |
| **2013-14** | 1,344,695 |  | 6,222 | $454.68 |
| **2014-15** | 1,344,695 |  | 6,269 | $425.19 |
| **2015-16** | 1,344,695 |  | 6,441 | $405.44 |
| **2016-17** | 1,728,143 |  | 6,268 | $417.25 |
| **2017-18** | 1,728,143 |  | 6,252 | $468.48 |
| **2018-19** | 1,728,143 |  | 7,137 | $369.26 |
| **2019-20** | 1,796,733 |  | 7,698 | $318.94 |
| **2020-21** | 1,796,733 |  | 8,262 | $368.98 |
| **2021-22** | 1,796,733 |  | 8,318 | $441.50 |
| **2022-23** | 1,796,733 |  | 7,666 | $382.24 |

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**a. Fiscal Year’s Energy Evaluations via State Energy Office Annual Report**

|  |  |
| --- | --- |
|  | **ENERGY EVALUATION** |
| **Year** | **Energy $ Avoided** | **Energy $/GSF** | **$/MMBtu** | **$/MMBtu %Change from BLY** | **Btu/Sf** | **Btu/Sf % Change from BLY** |
| **2005-06** | $170,519 | $1.59 | $13.47 | 1% | 117,993 | -10% |
| **2006-07** | $378,379 | $1.79 | $16.40 | 23% | 109,189 | -17% |
| **2007-08** | $266,327 | $2.09 | $17.76 | 33% | 117,749 | -10% |
| **2008-09** | $183,001 | $2.06 | $16.96 | 27% | 121,520 | -7% |
| **2009-10** | $281,692 | $1.99 | $17.12 | 28% | 116,437 | -11% |
| **2010-11** | $237,857 | $1.98 | $16.69 | 25% | 118,417 | -10% |
| **2011-12** | $618,574 | $1.62 | $16.13 | 21% | 100,687 | -23% |
| **2012-13** | $919,851 | $1.43 | $16.11 | 20% | 88,738 | -32% |
| **2013-14** | $1,012,366 | $1.44 | $16.71 | 25% | 86,150 | -34% |
| **2014-15** | $1,150,098 | $1.33 | $16.69 | 25% | 79,955 | -39% |
| **2015-16** | $1,162,784 | $1.31 | $16.56 | 24% | 78,968 | -40% |
| **2016-17** | $1,302,480 | $1.29 | $17.25 | 29% | 75,042 | -43% |
| **2017-18** | $1,850,044 | $1.32 | $18.22 | 36% | 72,432 | -45% |
| **2018-19** | $841,417 | $1.11 | $12.17 | -9% | 91,181 | -30% |
| **2019-20** | $1,028,428 | $1.04 | $12.43 | -7% | 83,325 | -36% |
| **2020-21** | $1,115,364 | $1.21 | $13.98 | 4% | 86,777 | -34% |
| **2021-22** | $2,605,061 | $1.45 | $22.10 | 65% | 65,589 | -50% |
| **2022-23** | $1,455,172 | $1.24 | $15.65 | 17% | 79,452 | -39% |

**b. Fiscal Year’s Water/Sewer Evaluations via State Energy Office Annual Report**

|  |  |
| --- | --- |
|  | **WATER/SEWER EVALUATION** |
| **Year** | **Water $ Avoided** | **$/KGal** | **$/KGal %Change from BLY** | **Gal/Sf** | **Gal/Sf %Change from BLY** |
| **2005-06** | -$180,955 | $21.21 | 0% | 44.14 | 25% |
| **2006-07** | -$199,872 | $21.21 | 0% | 44.22 | 26% |
| **2007-08** | -$231,956 | $22.71 | 7% | 44.40 | 26% |
| **2008-09** | -$18,032 | $23.83 | 12% | 35.92 | 2% |
| **2009-10** | $3,621 | $26.34 | 24% | 35.11 | 0% |
| **2010-11** | $17,146 | $26.20 | 24% | 34.65 | -2% |
| **2011-12** | $305,186 | $28.22 | 33% | 26.63 | -24% |
| **2012-13** | $402,599 | $27.72 | 31% | 24.44 | -31% |
| **2013-14** | $494,013 | $28.31 | 33% | 22.26 | -37% |
| **2014-15** | $508,395 | $28.31 | 33% | 21.88 | -38% |
| **2015-16** | $521,248 | $28.31 | 33% | 21.54 | -39% |
| **2016-17** | $487,727 | $28.31 | 33% | 22.43 | -36% |
| **2017-18** | $388,954 | $23.85 | 12% | 25.80 | -27% |
| **2018-19** | $790,721 | $27.64 | 30% | 18.69 | -47% |
| **2019-20** | $959,106 | $29.06 | 37% | 16.14 | -54% |
| **2020-21** | $795,714 | $26.63 | 26% | 18.61 | -47% |
| **2021-22** | $976,708 | $27.75 | 31% | 15.65 | -56% |
| **2022-23** | $1,094,993 | $28.32 | 34% | 13.71 | -61% |

[GSF = Gross Square Feet] [MMBtu = Metric Million British Thermal Unit] [KGal = Kilogallon (1,000 Gal)] [BLY= Baseline Year]



# UPCOMING ACTION PLANS FY ’23-24

Because utility consumption is impacted and consumed in some manner by everyone interacting with the campus facilities we will continue to expand and implement the following actions:

1. The Sustainability Intern position will be reinstated to further campus outreach regarding sustainability and sustainable practices. This will also allow for educational experiences where the intern can spread awareness and information on utility consumption and reduction with their peers. This position will also allow a student the ability to gain hands on experience in a professional setting while exploring their interest of sustainability and the environment.
2. The University has plans to continue upgrades on lighting in the following locations:
	1. Givens Performing Arts Center lobby spaces
	2. Oxendine Science building to corridors
	3. James B. Chavis University Center lounge spaces
	4. James B. Chavis University Center Dining Hall
3. Four new car-charging stations are being opened to the public in the parking lot outside of Grace P. Johnson Stadium during the Fall 2023 semester. These charging stations will be open to the public for charging their vehicles at no cost. These new stations will increase the campus total of electric car charging stations to 10. These specific EV charging stations are also connected to our IT network to provide us with usage data that we will be able to monitor and determine how often the charges are being used.
4. UNCP is also seeking the opportunity to move forward with obtaining a solar array as an alternate energy source to charge its fleet of golf-carts.
5. A pilot project for rainwater harvesting began in the Spring of 2023 to offset the water used for landscaping on the campus, with the intention to expand the project to other areas of campus that do not have irrigation systems. For the new fiscal year, we are looking at two other possible locations to implement rainwater harvesting barrels. One location would be for lawn irrigation purposes while the second would be for watering a campus garden.

# EFFICIENCY MEASURES COMPLETED FY ’22-23

**Energy Awareness Campaign & Strategy**

1. Over 50% percent of energy consumption was avoided with the assistance of Siemens’ Guaranteed Savings Program, employee and student awareness, and conservation choices.
* We spent **$2,234,481** and saved **$472,561** on energy in the 2022-23 Fiscal Year.
1. We continue to calculate the yearly impact of utilities based on campus-wide consumption and cost.
	* We have reduced our energy cost per square foot by 29.45% from the 2002-03 baseline as of 2023.
2. Updated the Energy and Sustainability webpage to provide accurate initiatives and news.
3. Calculate and report our HB 1292 energy savings from conservation projects to the State Energy Office.
	* Our calculated HB 1292 savings for FY ’22-23 were **$582,725.**
4. The following projects were completed during the 2022-2023 Fiscal Year:

**Old Main**

1. LED lighting upgrade in the Lawrence Locklear Suite

**Jones Health & PE**

1. LED lighting upgrade to all exterior fixtures
2. LED lighting upgrade to all interior fixtures

**Oxendine Science Bldg.**

 1. LED lighting upgrade to all interior fixtures

 2. LED lighting upgrade to all exterior fixtures

**Weinstein Health Science**

1. LED lighting upgrade to all interior fixtures
2. LED lighting upgrade to all exterior fixtures

**Sampson Bldg.**

1. LED lighting upgrade to first floor corridors

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# SIGNATURE PAGE

Strategic Energy & Water Plan

I have read and support this Strategic Energy & Water Plan for my Organization

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